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ABSTRACT

Technology Mediated Instruction (TMI) is an alternate mode of instructional delivery that provides several benefits. In addition to assisting information transfer through integration of course material, TMI fosters instructor-student interaction through methods such as interactive question-answer areas, video-based office hours, e-mail, and Internet chatrooms. It facilitates cooperation among students through collaborative, team-based projects, and has the ability to connect geographically dispersed students. TMI provides prompt feedback to the learner, and increases the amount and quality of learning activities, since the "classroom" is not limited to formal meeting times. TMI creates unique opportunities for the communication of quality curriculum, and a well-designed course will accommodate diverse talents and different modes of learning. However, in order to implement TMI successfully, both time and money must be invested for equipment maintenance, staff development, and student services. And TMI should enhance, not replace, the tradition of quality teaching. (YKH)

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Guidelines for Good Practice: Technology Mediated Instruction

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Guidelines for Good Practice: Technology Mediated Instruction

The Academic Senate for California Community Colleges

Adopted Fall 1997

Technology Committee 1996 - 97

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Introduction

As a society, we are racing along a revolutionary path of developing technological tools which have the potential to aid the teaching and learning process. New hardware and software continues to be developed with rapid speed; and as a faculty we need to plan for how to best utilize these tools. Other educational groups have developed standards around the use of technology in their instructional programs. The Executive Committee of the Academic Senate for the California Community Colleges, through the President, directed the Technology Committee to develop guidelines for our faculty. The focus of this paper is to establish guidelines for good practices for using Technology Mediated Instruction (TMI). The emphasis is centered around the concept that good teaching is good teaching, regardless of the medium or method chosen for delivery. This paper underscores that technology mediated instruction is an alternate mode of delivery, another tool in the instructor's toolbox, and should be held to the same standards as any other delivery method. This paper is not meant to suggest that traditional classroom instruction is obsolete or inferior. When appropriate, technology may assist learners in achieving their particular goals. Decisions surrounding the use of technology needs to be in the hands of the faculty.

Chickering and Ehrmann (1996) discussed the implementation of The Seven Principles for Good Instruction, using technology, as an outgrowth of an earlier paper by Chickering and Gamson (1987) on good teaching principles. The American Council of Education assembled a task force of business and education professionals in 1996 to establish Guiding Principles for Distance Learning in a Learning Society. The Academic Senate for California Community Colleges wrote a review of social, fiscal and educational issues surrounding Distance Learning in California Community Colleges (1993). The Academic Senate of the California State University released a set of Guiding Principles for Technology Mediated Instruction in 1996 as well. The Western Interstate Commission on Higher Education (WICHE) has established guidelines for the use of technology as an educational tool (1995) (See Appendix). As we examine the role of technology in the teaching and learning processes, it would be beneficial to remember these are time-tested ideas of good teaching practice, regardless of the methodologies. Extrapolating and extending these ideas to technology are discussed on the following pages.

Good Practice Encourages Effective Contact Between Students and Faculty
Chickering and Ehrmann (1996)

Instructor-student contact is a key component in the teaching/learning process. One can think of that process as having two components: *content transmittal/acquisition* and *learning facilitation/mastery*. In other words, the student must not only take in information but also learn the relevance of the material, the circumstances under which to apply the new knowledge, the relationship of this added data to that acquired previously, and so forth. Knowledge without context is not useful! That said, it is a reasonable assertion that information-transfer and context-setting do not necessarily take the same type or degree of instructor-student contact. For example, describing and explaining the internal components of a cell can be accomplished by a text, a video, or a multimedia CD-ROM presentation--largely independent of the characteristics of the instructor or student. However, making that information come alive takes the dynamic interaction of the teacher and learner. That, too, can be facilitated by communications technology, but the human dimension places special challenges on that process. Keep these two criteria and their different requirements in mind during the following discussion of technology mediated instructor-student contact.

When designed and implemented effectively, technology can assist *information transfer*. The video, multimedia, or web-based instruction can:

- relate the new material to previous student knowledge
- place new material properly in relationship to the rest of the course content
- create logical sequences for each element presented
- integrate introductory statements, detailed content, examples and illustrations, colorful asides designed to spur interest, and summative statements into a well-paced, attention-holding package
- intersperse instructional methodologies using different learning styles: logical/deductive with text-based material, verbal-visual with well-explained pictures and diagrams, visual-kinesthetic with interactive exercises, and so forth.
- anticipate areas of questions and supply appropriate replies

Technology can foster contact, providing additional vehicles for student/faculty interactions and placing the information in an *appropriate context*. Technology has given us additional tools to foster interaction in a student-driven manner adapted to the technology used, for example:

- web-based: frequently-asked-questions "FAQ" or interactive question-and-answer "Q&A" areas
- video-based; phone-in office hours or voice mail
- video-conferencing: "smart" cameras which can focus on students asking questions
- internet-based: e-mail distribution lists, chatrooms and bulletin boards
- FAX and e-mail has allowed for the passage of documents over distance

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None of these techniques is effective unless well-designed and implemented. Key criteria for *context-setting* instructor-student contacts include:

- easy access for the student to the technology (at home, at school, or at a community facility)
- rapid response by the instructor (same day, if possible)
- opportunities for feedback and incremental learning (such as exchange of draft documents with the instructor's editing comments)
- placing the problem area in context (such as instructor references to relevant material in the text, video, web site, etc.)
- efficient use of instructor time (chat rooms and distribution lists instead of just depending on individual e-mail messages--although individual communication should still be available to the student; FAQs instead of answering the same questions 20 times to 20 different students)

E-mail is evolving as a more common form of communication that is neither time nor space dependent, truly asynchronous. Studies have suggested that many students, including those who have learned English as a second language, find that e-mail allows them to carefully formulate their questions, double-checking spelling and syntax (Krauth, 1996). These questions can be formulated the instant that the student has the question. The faculty can more efficiently utilize their time by answering e-mail at convenient times and from various locations. By faculty answering the e-mail and voice mail frequently throughout the day, on and off campus as convenient the student receives more rapid replies. Of course, issues regarding faculty compensation for e-mail feedback, expectations of instructor availability and other workload issues must be addressed in conjunction with the collective bargaining agents.

Faculty must maintain their primary role in applying these standards of effective instructor-student contact. Title 5 Regulations requires courses taught using distance education to be approved by separate action of the curriculum committee. Campus curriculum committees must determine what constitutes effective personal contact and apply that standard as a minimum, the same way that they would with a campus based course. Most important is for the curriculum committee to assure that maximum use is made of the given technology to foster instructor-student contact, not using technology for only technology's sake. Efficient strategies can be developed to improve the addressing of repetitious questions, e.g., developing knowledge-based sites such as FAQs and Listservs. Taken to a different level, discussion (chat) rooms can be established where student questions may be posted and FAQs or they can encourage interactively between classmates, fostering collaborative learning. Desktop video-conferencing technology is rapidly developing so that "face-to-face" meetings will be more possible in asynchronous mode as well. With the continued development of the World Wide Web, these connections are possible from anywhere in the world. Additional technology can create individual learning environments with immediate feedback to the student, such as computer drill and practice, well designed web sites and other TMI.

Good Practice Develops Reciprocity and Cooperation Among Students
Chickering and Ehrmann (1996)

Education in a learner-centered model can be enhanced technologically by giving more team-based projects which create working situations for collaboration. Team based projects can be between members of the same course and/or class, or it may connect similar learning environments to create an even larger learning community. Cooperation among students can be assisted by technology in many ways:

- electronic communication can provide opportunities to transcend barriers posed by gender and racial/ethnic boundaries and promote equity of participation.
- chat rooms promote spontaneity and idea exchange
- bulletin boards allow longitudinal growth of ideas (once an issue is raised, all following responses are attached so that the train of thought of the group can be followed)
- electronic and video "role playing" fosters situational learning and "out-of-the-box" thinking
- e-mail allows peer review of papers

Technology makes it practical to connect students who are separated by vast distances, encouraging shared problem-solving and cooperation, widening the scope of student communities and extending the educational arena to a more global context.

Good Practice Uses Active Learning Techniques
Chickering and Ehrmann (1996)

The separation between a teacher and learner is based on more than just distance. Active learning has been shown to be most effective when the learner is engaged. Technology, when used well, can tailor the instruction and learning experience. As students become more involved in their learning, they assume greater responsibility for that learning. Examples include:

- interactive web-based and CD-ROM materials aid visual-kinesthetic learners
- e-mail promotes writing on-line recapturing previously-attempted materials (e.g., drafts of papers) removes the need for repetitive tasks (like retyping)
- multimedia simulations allow the student the opportunity to manipulate conditions that might otherwise be expensive or dangerous, such as chemical reactions.

Good Practice Gives Prompt Feedback
Chickering and Ehrmann (1996)

Individualized technology-mediated instruction has the capability of providing prompt and frequent feedback to the learner. That capability can be achieved only if certain factors are in place:

- students have access to the technology and log in and use the system regularly

- instructors respond frequently to the voicemail/e-mail/FAX AND/OR the system is set up to provide student-driven feedback in the form of FAQs, help screens, or structured learning environments (such as diagnostic tests which give direction to the student regarding the area in need of improvement and the resources available to enhance learning in that area)

Tracking and reporting student performance to the student and/or to the instructor can be built into the delivery system. Using technology, students can easily share their work with the instructor or other students for evaluation and collaboration independent of time or place.

Curriculum committees have the responsibility to ensure evaluation of student performance is adequate that course objectives have been met and course content covered. This is a key criteria for the committee to consider in the separate approval process for courses taught is distance learning mode, as per the Academic Senate for California Community Colleges' Guidelines for Distance Education course approval.

Good Practice Emphasizes Quality Time on Task
Chickering and Ehrmann (1996)

Not only can technology extend the time on task, it can also increase the quality of that time. The use of technology can provide learning directed and meaningful assignments and activities. Technology extends classroom activities beyond formalized meeting times. For example, a CD-ROM or web-based learning module can begin by assessing a students present knowledge and directing that student to an appropriate learning presentation. After going through the exercise, the system can assess learning of that task/skill/concept and diagnose the extent of learning, directing the student to another, differently structured cycle of learning or moving the student on to the next step in the module. Student work might be posted on the Web, promoting a more serious and broader audience than just the instructor and class peers.

A major issue raised by this time-on-task discussion is that of the relationship of units earned to time in the classroom. The Carnegie formula which suggests that a combination of in-class and out-of-class assignments should equal three hours per week for one unit of credit is generally cited as the standard for instruction. The relationship of time on task to units is less clear in a technology-mediated learning mode. So is the connection between classroom hours and faculty load. Generally, 15 lecture hours per week equate to a full teaching load. When one spends no hours at all in classroom teaching how should one's load be determined? Clearly, new or redefined relationships are needed. Curriculum groups will need to propose new approaches to calculating contact hours, seat time, student units as well as unions will need to establish new definitions of faculty load and apportionment.

Good Practice Communicates High Expectations
Chickering and Ehrmann (1996)

Instruction of any kind, using any delivery method, should start by establishing high standards of performance which are clearly defined and articulated. TMI creates unique opportunities for the communication of expectations, but the same standards for quality curriculum hold for TMI as for traditional modes. (See the *Curriculum Standards Handbook* for further guidance on these standards.)

- Is the course appropriate to the mission of community colleges?
- Does the course serve a unique need in the college curriculum?
- Is the offering of the course feasible given the resources of the college: faculty expertise, support staff, facilities, equipment, library holdings?
- Is the course in compliance with Title 5 Regulations?
- Is the course of appropriate quality, that is:
    1. Is the scope of the course described adequately?
    2. Are the objectives clearly stated and appropriate to the stated need for the course?
    3. Is the course content thorough and appropriate to the stated scope of the course?
    4. Are the types and examples cited for methods of instruction, assignments, methods of student evaluation, and texts complete and appropriate to meet course objectives and cover course content?
    5. If a credit course, is critical thinking integrated in the course components in the form of essays, problem-solving, or skills demonstrations?

Courses taught in distance education mode are subject to particularly close scrutiny by those beyond the campus boundaries. Demonstrated commitment to high standards of curriculum quality are necessary to assure that

- course outlines are followed and articulation agreements are maintained without the need to separately articulate TMI courses
- accreditation is maintained following the "Principles of Good Practices" adopted by the Accreditation Commission for Community and Junior Colleges to help ensure the quality, integrity, and effectiveness of distance learning. These good practices make the following points:
    1. coursework is of appropriate rigor and breath,
    2. degree or certificates are coherent and complete,
    3. program provides for real time faculty student interaction,
    4. courses are taught by qualified instructors,
    5. program provides faculty support services and training,
    6. program provides full range of student support and services, and
    7. institution demonstrates an ongoing commitment for students to complete degrees.

Good Practice Respects Diverse Talents and Modalities of Learning
Chickering and Ehrmann (1996)

Varied learning styles, multiple intelligence's and multi-sensory inputs can be addressed through various delivery methods including technology mediated instruction. Students have varied learning styles, and many traditional campus-based delivery methods emphasize a single modality, such as the lecture. Various technologies can provide an array of delivery techniques which can match the diverse learning styles accommodating the auditory, visual and kinesthetic, or various combinations when appropriately designed.

Good Practice Uses Appropriate Tools
The Academic Senate for California Community Colleges Technology Committee

Technology Mediated Instruction can be used to improve access and to provide alternate learning modalities, to reach individuals that might not readily make it to a campus, or who might have difficulty with a traditional campus approach. Provisions will need to be made to assist those students who do not have ready access to be able to get to the technology easily. Faculty should be encouraged and be provided with appropriate levels of support to develop new materials, as the content experts, in conjunction with instructional designers and software experts. Unions will need to help define intellectual property rights that are equable and encourage faculty participation. Wherever feasible students should be offered a choice of modalities - including classroom based and TMI - for a give course. It is essential that faculty consider the appropriate mix of TMI, personal contact, as well as classroom-based methods to match the subject matter and the students being served.

Lever-Duffy and Lemke and Johnson (1996) offered examples currently available in technology mediated instruction. These include:

Audio technologies such as:
- radio
- telephone
- voice mail
- and audiocassettes

Video technologies such as:
- television
- teleconferencing
- compressed video
- and prerecorded videocassettes

And information technologies such as:
- stand alone work stations
- CD ROM prepackaged multimedia
- e-mail
- chatrooms and bulletin boards
- and the World Wide Web

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Good Practice Is Self Renewing
The Academic Senate for California Community Colleges Technology Committee

Technology is an investment which requires a commitment to staff development, maintenance of tools and equipment, ongoing support and emerging technologies. Like all practices surrounding instruction there needs to be an ongoing investment in the hardware, software and human resources to perfect that which works well. Consideration of balance in the curriculum mix as well as college budget needs must be addressed by local senates. Particularly with TMI, ongoing funding for technical support and staffing is essential to guarantee students consistent access to instruction.

Good Practice Recognizes the Need for Comprehensive Student Services
The Academic Senate for California Community Colleges Technology Committee

A comprehensive approach to TMI must address student services as well as learning needs. It may be that different types of students would be involved with distance education programs, some taking their entire course load at a distance from the campus, and some that might supplement their on-campus coursework with one offered through a form of TMI. Students success requires that students feel connected to the institution and have the full range of student services available:

- One stop on-line registration
- Frequent contact between the instructor and student using phone, FAX, e-mail
- Peer tutoring, small group discussions
- Bookstore services with text and printed material delivery
- Financial aid

Summary

Technology Mediated Instruction (TMI) offers additional instructional delivery tools and strategies which complement those currently in the academy. When used appropriately that should facilitate learning and the interactions between the student and the faculty. TMI should be considered to be another modality of instruction and treated in the same way as other delivery methods. Good teaching practice seeks the appropriate modality, and good practice recognizes the needs of the learner and the facilitator. Technology is not enough by itself. As rapid advancements in technology continue to happen, we should be mindful of their potential as instructional tools, when placed in the hands of qualified and trained faculty. These are tools that might allow us to reach students in new ways. This paper attempts to show that there can be a complementary role of technology mediated instruction.

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Glossary of Terms

Asynchronous: not at the same time.
Bulletin boards (electronic): electronic threaded discussions in which participants can follow the flow of discussion between multiple participants.
CD ROM: a storage media in which data is encoded onto disks which are read by laser, can contain multimedia.
Chatrooms: an electronic space where multiple users can type in responses and dialog with other participants who are on-line at the same time.
Distribution lists: a collection of e-mail addresses that can be easily grouped for convenient mailing to all participants at the same time.
E-mail: electronic mail delivered over a network.
FAQ (Frequently Asked Questions): a collection of the most often asked questions so that answers can be posted to assist new users.
FAX: facsimile machine, an electronic device which distributes printed material to another location using phone lines and networks.
Hardware: physical devices such as computers, telephones.
Internet: a network of computers which are electronically connected, usually refers to the greater world wide web.
Listservs: an automated electronic distribution service which e-mails information to subscribers
Multimedia: a mixture of graphics, motion, sound, text.
Q&As (Questions and Answers): a posting of a series of questions anticipated, with their corresponding answers.
Smart Cameras: video input devices capable of automatically finding and focusing on the speaker in a room of people.
Software: the coded programs that make the hardware function.
Synchronous: at the same time.
Technology Mediate Instruction: using various devices to assist in the teaching and learning process.
Title 5 Regulations: part of the California Education Code.
Video: images, either still or moving.
Video Based Voice Mail: the ability to communicate across phone lines delivering voice and images at the same time.
Videoconferencing: two or more distant sites communicating voice and video with each other, interactive TV.
Voice Mail: the ability to leave a record voice message which is stored and retrieved at a later date.
WEB (World Wide Web): a collection of a very large number of computers around the globe, all interconnected to be able to share resources.
Web site: a single computer device which stores data that can be access remotely.

Appendix

Principles of Good Practice for Electronically Offered Academic Degree and Certificate Programs

Preamble

These Principles are the product of a Western Cooperative for Educational Telecommunications project, Balancing Quality and Access: Reducing State Policy Barriers to Electronically Delivered Higher Education Programs. The three-year project, supported by the U.S. Department of Education's Fund for the Improvement of Postsecondary Education, is designed to foster an interstate environment that encourages the electronic provision of quality higher education programs across state lines. The Principles have been developed by a group representing the Western states' higher education regulating agencies, higher education institutions, and the regional accrediting community.

Recognizing that the context for learning in our society is undergoing profound changes, those charged with developing the Principles have tried not to tie them to or compare them to traditional campus structures. The Principles are also designed to be sufficiently flexible that institutions offering a range of programs—from graduate degrees to certificates—will find them useful.

Several assumptions form the basis for these Principles:

- The electronically offered program is provided by or through an institution that is accredited by a nationally recognized accrediting body.
- The institution's programs holding specialized accreditation meet the same requirements when offered electronically.
- The "institution" may be a traditional higher education institution, a consortium of such institutions, or another type of organization or entity.
- These Principles address programs rather than individual courses.
- It is the institution's responsibility to review educational programs it provides via technology in terms of its own internally applied definitions of these Principles.

Curriculum and Instruction

- Each program of study results in learning outcomes appropriate to the rigor and breadth of the degree or certificate awarded.
- An electronically offered degree or certificate program is coherent and complete.
- The program provides for appropriate real-time or delayed interaction between faculty and students and among students.
- Qualified faculty provide appropriate oversight of the program electronically offered.

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Institutional Context and Commitment

Role and Mission

- The program is consistent with the institution's role and mission.
- Review and approval processes ensure the appropriateness of the technology being used to meet the program's objectives.

Faculty Support

- The program provides faculty support services specifically related to teaching via an electronic system.
- The program provides training for faculty who teach via the use of technology.

Resources for Learning

- The program ensures that appropriate learning resources are available to students.

Students and Student Services

- The program provides students with clear, complete, and timely information on the curriculum, course and degree requirements, nature of faculty/student interaction, assumptions about technological competence and skills, technical equipment requirements, availability of academic support services and financial aid resources, and costs and payment policies.
- Enrolled students have reasonable and adequate access to the range of student services appropriate to support their learning.
- Accepted students have the background, knowledge, and technical skills needed to undertake the program.
- Advertising, recruiting, and admissions materials clearly and accurately represent the program and the services available.

Commitment to Support

- Policies for faculty evaluation include appropriate consideration of teaching and scholarly activities related to electronically offered programs.
- The institution demonstrates a commitment to ongoing support, both financial and technical, and to continuation of the program for a period sufficient to enable students to complete a degree/certificate.

Evaluation and Assessment

- The institution evaluates the program's educational effectiveness, including assessments of student learning outcomes, student retention, and student and faculty satisfaction. Students have access to such program evaluation data.
- The institution provides for assessment and documentation of student achievement in each course and at completion of the program.

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